Effects of CP55, 940 on Conditioned Defeat in Syrian Hamsters (*Mesocricetus auratus*)

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There are several standard paradigms to investigate anxiety in the lab. For example, the elevated plus maze, hole board test, foot shock, and learned fear can be used to investigate neurological and pharmacological controls of anxiety-like behaviors in rodents. Our lab studies a type of learned fear, conditioned defeat, in Syrian hamsters. In this paradigm, experimental animals are paired with an aggressive conspecific and are defeated for fifteen minutes. Twenty-four hours after the defeat, experimental animals are tested in an avoidance paradigm where they are placed in a neutral arena with a restrained conspecific. Time spent in the half of the cage furthest from the restrained animal can be scored as a measure of avoidance. We interpret more time spent avoiding and increased risk assessments as increased anxiety caused by the previous experience of defeat.

There is evidence from mouse and rat studies that activating the cannabinoid (CB) system with CB receptor agonists bi-directionally controls acquisition of anxiety-like behaviors. That is, low doses of CB receptor agonists appear to diminish anxiety-like behaviors (are anxiolytic) while high doses increase anxiety-like behaviors (are anxiogenic) when given before exposure to a stressor. To test the hypothesis that activating the cannabinoid system will alter the acquisition of conditioned defeat, we performed a dose-response study using low and high doses of the cannabinoid receptor agonist CP55,940. Our preliminary data indicate that the low dose of CP55,940 decreases the acquisition of conditioned defeat (less time spent in avoidance), whereas the high dose of CP55,940 increases the acquisition of conditioned defeat (more time spent avoiding the opponent). This implies that activating CB receptors is sufficient to modulate the acquisition of conditioned defeat. Future studies using CB receptor antagonists will address the question of whether this system is necessary for the acquisition of conditioned defeat. After establishing a behavioral effect of the cannabinoid system on conditioned defeat, we will also investigate how this system interacts with specific brain circuits known to control conditioned defeat such as the amygdala, hippocampus, and medial prefrontal cortex.

All animal protocols were approved by the Georgia State Institutional Animal Care and Use Committee.

Key words:
Cannabinoid, anxiety, fear, memory, learning, encoding, marijuana, drugs, neuroscience, behavior